Competitive
INNOVATIVE
Sustainable

Environmental and Renewable Energy Industries in Atlantic Canada

Atlantic Canada Opportunities Agency
Agence de promotion économique du Canada atlantique
Canada


Newfoundland
and Labrador
CANADA
Prince Edward Island
New Brunswick
Nova Scotia

Introduction

Environmental and Renewable Energy Industries in Atlantic Canada

Experts predict that the environment will be the number one investment opportunity of the 21st century, with heightened potential in the next 20 to 30 years[1].

Increasingly, companies around the world are moving toward integrated environmental and economic solutions and Atlantic Canadian companies have demonstrated the ability to provide this expertise. Atlantic Canada's environmental industry is knowledge-based, providing C$1.5[2] billion annually in products and services internationally. And renewable energy is rapidly increasing as one of the region's key economic industries.

Canada's energy industry is vitally important to our national economy. Exporting our energy to the United States generates more than C$100 billion a year and as a result, Canada is emerging as an energy superpower. Our real challenge however, is to be a clean energy superpower.

The four Atlantic provinces of New Brunswick, Newfoundland and Labrador, Nova Scotia and Prince Edward Island have a long history of environmental stewardship in their traditional industries. Many of the region's companies and institutions have a strong presence in the environmental industry with over 800[3] firms operating in this sector.

Contaminated air, water and soil, as well as a changing climate, are serious global challenges. Solutions to these environmental issues represent a growing world market for new technologies and new innovative businesses.

To help meet this challenge, Canada's government has invested over C$2 billion in ecoenergy initiatives in part to develop next-generation cleaner energy technologies. And in Atlantic Canada, we have abundant sources of alternative energy including wind, biomass, geothermal, solar, hydro, nuclear and ocean energy.

Atlantic Canada is poised for growth and we are looking for partners.

Companies looking for an ideal environment in which to grow need look no further than Atlantic Canada. Whether it's research and development, or manufacturing facilities, you will find an unmatched location here.

And if you are looking for research partners, there are many innovative companies interested in developing business relationships that will propel them into the global economy.

If you want to be part of these exciting growth industries, Atlantic Canada needs to be on your shortlist.

And if you aren't convinced, here are five more reasons why you should consider Atlantic Canada for your business:

1. Atlantic Canada is strategically the gateway to North America from Europe – world-class air, land and sea access to all major U.S. markets;
2. Atlantic Canada is ranked among the lowest business-costs locations within G8 countries;
3. Atlantic Canada is home to more post-secondary graduates per capita than the Canadian and U.S. averages, resulting in a highly skilled labour force;
4. Atlantic Canada's has cutting-edge environmental and renewable industries research and development capabilities; and
5. Atlantic Canada's research and development initiatives are supported through government-funded programs including competitive regional incentive programs.

We call this Canada's *Atlantic Advantage.*

1 **SOURCE:** *Investing in Climate Change – An Asset Management Perspective. Deutsche Bank. October 2007.*
2 **SOURCE:** *Statistics Canada*
3 **SOURCE:** *Statistics Canada*

World Class Research & Development

Atlantic Canada's universities and institutes are involved in cutting-edge research which supports the growth of the environmental and renewable energy industries in our region, and beyond.

UNIVERSITIES WITH ACTIVE ENVIRONMENTAL TECHNOLOGY RESEARCH:

- **Acadia University**, Wolfville, NS
- **Dalhousie University**, Halifax, NS
- **St. Francis Xavier University**, Antigonish, NS
- **Mount Allison University**, Sackville, NB
- **Université de Moncton**, Moncton, Edmunston & Shippagan, NB
- **University of New Brunswick**, Fredericton & Saint John, NB
- **Memorial University of Newfoundland**, St. John's, NL

Environmental Research

Dalhousie University (Halifax, NS) is home to the Centre for Water Resources Studies, which is developing international expertise in the areas of water treatment and water management; the Coastal Resources Research Network, which supports researchers in developing countries in their efforts to research and promote community-based coastal resources management; and The Centre for Marine Environmental Protection, which is developing technologies for the observation and protection of marine environments.

Memorial University of Newfoundland (St. John's, NL) is home to the Department of Earth Sciences and the Centre for Earth Resources Research, which has extensive capabilities and facilities in low temperature isotope geochemistry and the studies of pollution; groundwater flow; and elemental cycling through the lithosphere, biosphere, hydrosphere and atmosphere. The centre also has the capability for shallow marine seafloor seismic profiling used in seabed site surveys; paleoclimatological and sedimentological research; igneous and metamorphic petrology; radiogenic isotope geochemistry; geochronology; and economic geology.

Université de Moncton (Moncton, Edmundston and Shippagan, NB) has established the Eastern Canada Soil and Water Conservation Centre, which works cooperatively and complementarily with private and public stakeholders to promote sustainable resource management in agriculture; the Centre de génie éolien which conducts research into alternate sources of energy; and The Coastal Zone Research Institute, which works closely with the aquaculture and peat industries and conducts research to develop new and value-added marine-based products.

Mount Allison University (Sackville, NB) has established an institute comprised of a facility and personnel for the study of coastal wetlands at the biological, chemical and physical levels. The facility includes a state-of-the-art controlled-environment glasshouse for the culturing and study of marsh organisms and the study of wetlands sediment dynamics, and laboratories for environmental research. The institute's mandate is to promote and conduct research and educational outreach on scientific, social, and economic aspects of coastal wetland environments.

University of New Brunswick (Fredericton, NB) focuses on environmental research through its Research Chair in Wildlife Ecology, which conducts advanced research into wildlife as part of the Atlantic Co-operative Wildlife Ecology Research Network; and its Chair in Environmental Design Engineering.

University of New Brunswick (Saint John, NB) hosts the Canadian Rivers Institute, which is mandated to teach and carry out multi-disciplinary basic and applied research focusing on river ecosystems including their land-water linkages, for the purpose of conservation and habitat restoration.

The **Department of Fisheries and Oceans' Gulf Fisheries Centre** (Moncton, NB) focuses on marine environmental sciences operating the St. Andrews Biological Station which conducts marine environmental research, including the effects of toxic chemicals on the marine environment.

The K.C. Irving Environmental Science Centre at **Acadia University** (Wolfville, NS) contains state-of-the-art environmental trace analysis research laboratories, and the only dedicated climate change phytotrons in eastern Canada.

The Research and Productivity Council in Fredericton, New Brunswick

The College of the North Atlantic, which has campuses throughout Newfoundland & Labrador

The **Environmental Sciences Research Centre at St. Francis Xavier University** (Antigonish, NS) conducts advanced research into a variety of subjects including climate change; aquatic and soil biogeochemistry; renewable energies (geothermal and wind power); and innovation in environmental monitoring.

Renewable Energy Research

Renewable energy is rapidly increasing as one of Atlantic Canada's key economic sectors. Wind farms are emerging across the region, contributing power to the electricity grid.

Atlantic Canada's traditional forestry sector is being considered as a source of cellulosic biofuel opportunities, and University of New Brunswick (Fredericton, NB) scientists are conducting ground-breaking research into hydrogen fuel cells.

The **Wind Energy Institute of Canada** (WEICan) is Canada's leading testing and research institute for wind energy systems. It supports a wide variety of research, development and demonstration (RD&D) into distributed generation, small wind turbines, as well as wind-hybrid systems for remote and off-grid applications. WEICan offers testing and certification services for small and large wind systems as well as technical consultation where this complements the Institute's core RD&D focus. WEICan actively seeks industry partners that are keen to leverage WEICan's world-class facilities in the pursuit of RD&D activities that have significant potential benefit for the Canadian and Global wind industries.

The **PEI Energy Corporation's Wind-Hydrogen Village** is Canada's first wind-hydrogen village demonstration project. This multi-faceted initiative will demonstrate – in real-life and in real-time – how wind energy and hydrogen technologies can work together to offer clean and sustainable energy solutions across a wide range of applications.

Work is also being done to generate clean, renewable energy from the powerful tides of the Bay of Fundy. As a result, Nova Scotia is becoming a world leader in tidal energy research. The province's tidal research facility – to be constructed in the area of the Minas Channel – is leading the research into tidal power projects in the Bay of Fundy. The research facility has strong private sector participation from **EnCana, Nova Scotia Power**, Ireland's **OpenHydro**, Maryland's **UEK Corporation**, **Minas Basin Pulp and Power Co.** and **Clean Current Power Systems Incorporated** of British Columbia.

New Brunswick is also involved in tidal energy research in the Bay of Fundy. Irving Oil has partnered with the St. Andrews, New Brunswick-based Huntsman Marine Science Centre explore the feasibility of tidal power development in 11 potential power generating sites in the Bay of Fundy.

Saint Francis Xavier University (Antigonish, NS) is currently studying the long-term development capacity for geothermal and wind energy in Atlantic Canada. This research is unprecedented in Atlantic Canada as it will help determine not only the amount of wind and geothermal energy available, but the optimal level of development that preserves environmental quality.

Newfoundland and Labrador Hydro is collaborating with **Memorial University of Newfoundland** (St. John's, NL), **University of New Brunswick** (Fredericton, NB) and **Natural Resources Canada** to develop a green technology mix of wind, hydrogen and diesel power for remote communities. The $10 million research project will provide an important contribution towards the use of green energy in Canada's rural and remote communities.

The **Genesis Centre** at **Memorial University** (St. John's, NL) provides commercialization support for small companies. A current tenant is developing a control system for integrating wind power into a household environment.

The University of New Brunswick (Fredericton, NB) has partnered with a world-leader in wastewater treatment technologies, **ADI Systems**, to develop and market a new anaerobic digester to treat high strength biodegradable wastewater and liquid slurries. The new bioreactor will generate bio-energy while treating wastewater more efficiently.

The Burin campus of the **College of the North Atlantic** has developed – and is testing – a wave-powered pumping system that can be built at an economical cost, and can be easily commissioned and maintained.

Industry
Capacity Building

Atlantic Canada's environmental and renewable energy industries are well supported by industry associations that work together to develop and enhance the sector.

Industry Associations

The **New Brunswick Environment Industry Association** is a non-profit organization dedicated to promoting the growth and development of the environment industry in New Brunswick. It helps its members maximize opportunities, improve competitiveness, reduce costs and expand regional activities.

The **Newfoundland and Labrador Environmental Industry Association** provides a strong unified voice for communication and cooperation among the private sector, government, and non-profit entities involved in Newfoundland and Labrador's environment industry. The Association keeps its members informed of industry happenings and issues, and hosts regular events including trade shows, conferences, seminars and workshops.

The **Environmental Services Association Nova Scotia** is a business organization that promotes environmental products and services and contributes to sustainable development in Nova Scotia. It provides networking events, weekly newsletters, policy development, training, and export development. Also in Nova Scotia, the **Eco-Efficiency Centre** is mandated to help the province's small businesses to become more eco-efficient.

The **Atlantica Centre for Energy** (Saint John, NB) is setting an agenda for the energy cluster that will drive economic development and advance research and development in the region's growing energy sector. The Centre's mandate includes alternative energy production; renewables; and energy conservation and efficiency in its focus on development of a long-term, secure supply of clean, responsibly-produced energy products and services.

There's no question that Atlantic Canada's environmental and renewable energy industries are well-supported by educational institutions and industry associations, but what about the government?

Government Support

The Government of Canada supports the research, development and demonstration of the next-generation, clean-energy technologies. So when you invest in Atlantic Canada, you have a partner in both the provincial and federal governments, and there are multiple funding programs that can be accessed.

ecoENERGY Renewable Initiative

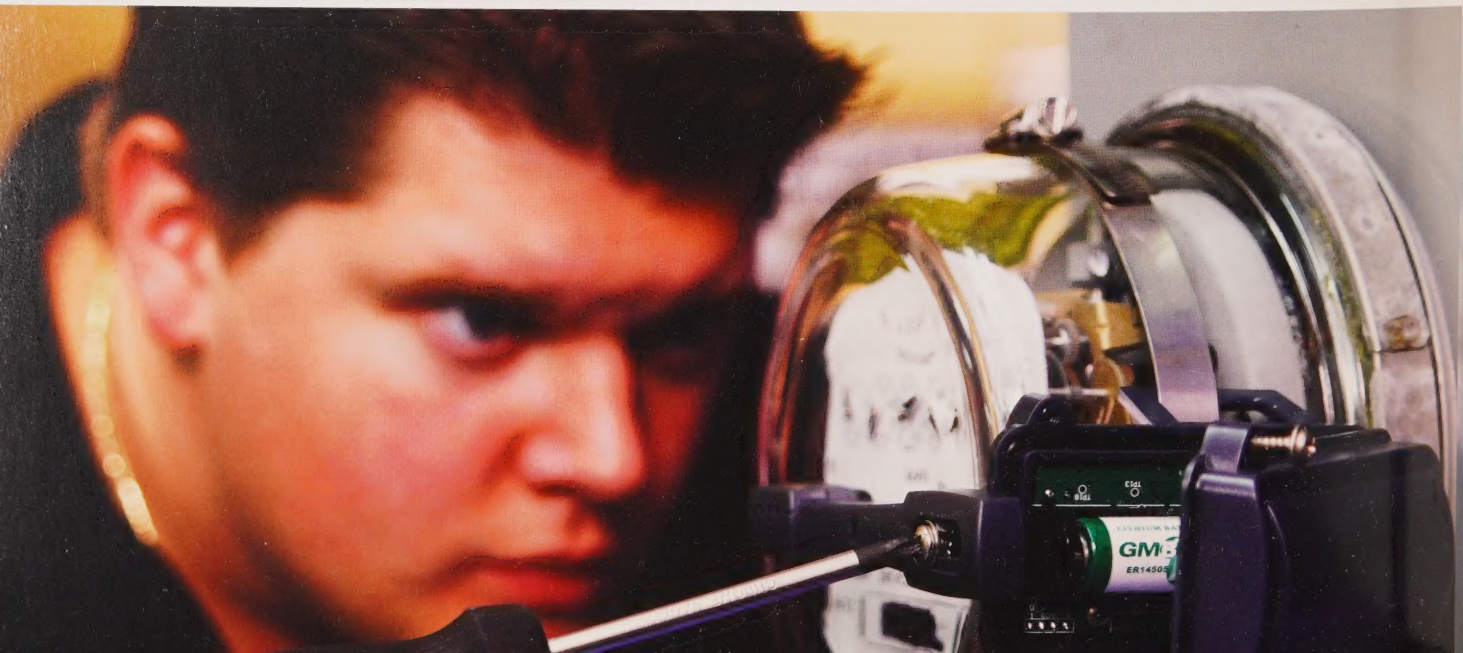
This Government of Canada program provides funding support for projects that involve emerging clean, renewable, power sources like wind, biomass and small hydro. It also supports projects that lead to the development of clean-energy systems, such as solar air and water heating, and geothermal technologies.

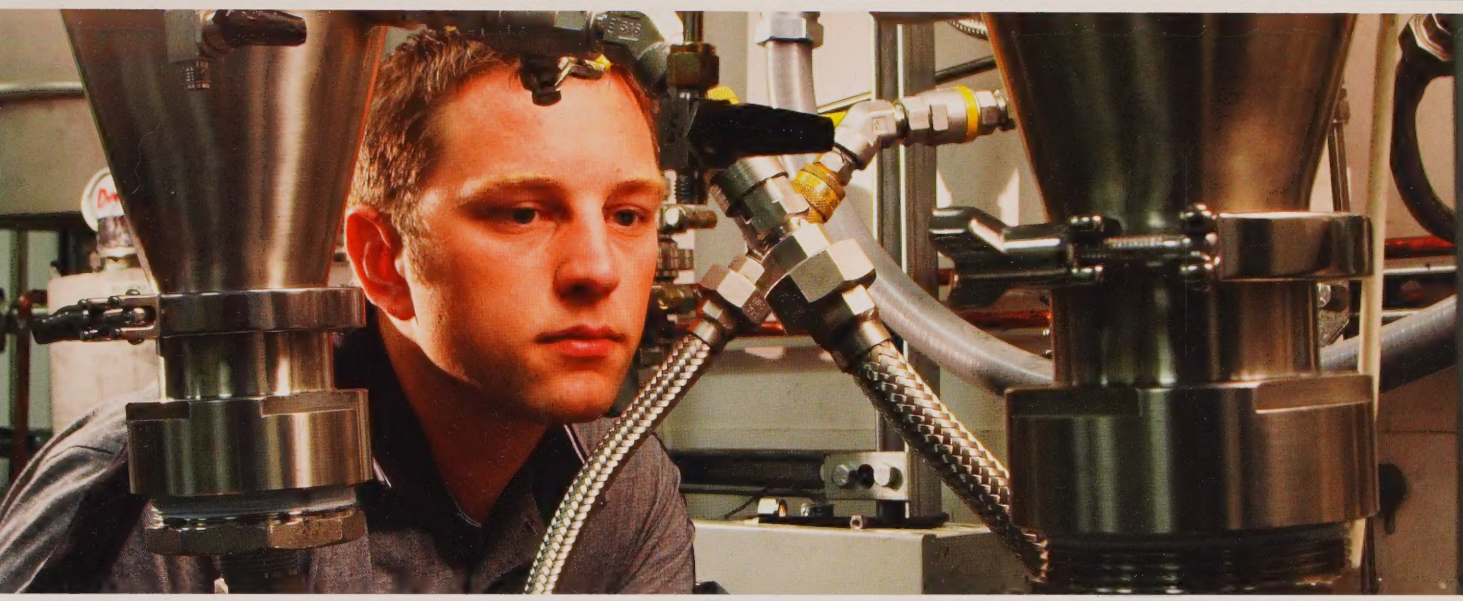
Sustainable Development Technology Canada

Sustainable Development Technology Canada, (SDTC), is a not-for-profit foundation that finances and supports the development and demonstration of clean technologies which provide solutions to issues of climate change; clean air; water quality; and soil, and which deliver economic, environmental and health benefits to Canadians.

SDTC operates two funds aimed at the development and demonstration of innovative technological solutions. The $550 million SD Tech Fund™ supports projects that address climate change, air quality, clean water, and clean soil. The $500 million NextGen Biofuels Fund™ supports the establishment of first-of-kind large demonstration-scale facilities for the production of next-generation renewable fuels.

Blueline Innovations in St. John's Newfoundland & Labrador





Atlantic Hydrogen, Fredericton, New Brunswick

Atlantic Canada Opportunities Agency

The Atlantic Canada Opportunities Agency, (ACOA), offers support programs designed to stimulate the development and commercialization of new technologies in Atlantic Canada. ACOA administers the *Atlantic Innovation Fund* which provides research and development funding support to stimulate innovation in the region.

Provincial economic development agencies

The governments of all four Atlantic provinces have economic development agencies mandated to attract industry and support the growth of key sectors within the provincial governments. All four provinces are pursuing renewable energy sector development strategies and there are a number of potential funding programs that could be used to support the attraction of environmental and renewable energy firms to the region:

- P.E.I. Business Development;
- Nova Scotia Business Inc.;
- Business New Brunswick; and the
- Newfoundland and Labrador Department of Innovation, Trade and Rural Development.

A stable government and economic growth to help fuel environmental and renewable energy industries opportunities are just two more Atlantic Canadian advantages.

The Opportunities

Environmental and renewable energy industries opportunities exist for multinational firms to invest in Atlantic Canada either as a greenfield operation or through joint ventures with local firms.

Environmental technologies such as marine management build upon Atlantic Canada's historical strengths in ocean-based industries such as the fishery, and most recently, the region's offshore oil & gas sector. Renewable energy takes advantage of the area's strong agriculture and forestry industries, as well as the wind potential in the region.

There is also potential for geothermal, solar and hydrogen technologies. Environmental biotechnology holds significant potential because of our region's existing research strengths within our universities; our growing onshore and offshore oil & gas exploration; and production activities. Water and wastewater technologies are also a growing opportunity in Atlantic Canada because of existing strengths within our corporate sector and our universities.

Active Wind Energy Projects in Atlantic Canada

ENVIRONMENTAL TECHNOLOGY FOCUS	CLUSTERS	POTENTIAL FOR R&D COMMERCIALIZATION
Marine Management	• Ocean Technologies • Cold Water Environmental Technologies • Early Stage Offshore Oil & Gas	• Geomatics/GIS/Coastal zone mapping • Virtual marine technologies • Ocean observation • Acoustics (hydrography/oceanography) • Acoustics & radio tags with GPS/Data storage tags • Power distribution for vessels • Oil spill containment
Renewable Energy	• Wind Power • Geothermal • Tidal Power	• Methane monitoring • Pipeline leak detection • Wind turbine monitoring • Wind farms • Biodiesel/Biofuels • Biomass for electricity generation • Wind/Hydrogen technology • Hot air/solar heating power • Tidal energy test site • Tidal energy research
Environmental Biotechnology	• Agri/Forest bioengineering • Bioremediation/ Tar Ponds	• Biofermentation/bioprocessing of agri-waste products • Bioremediation for Oil & Gas industry • Analytical devices for contaminated soils • Ionic liquids • Recombinant luciferase (ATP)
Water/Wastewater Treatment	• Water Quality	• Groundwater monitoring • Contaminant removal

SOURCE: *Foundation for Growth: Advancing Environmental Research Commercialization in Atlantic Canada (2006)*

Diversified Metal Engineering Marine Exhaust Solutions, in Charlottetown, Prince Edward Island

Environment Industry Opportunities

Atlantic Canada has been successful in developing innovative solutions for the evolving challenges that have impacted both the environment and human health, and many of these solutions have been exported both nationally and internationally. Examples include:

- the first fully integrated waste management facility in Canada;
- a breakthrough mobile environmental cleanup unit;
- biodegradable peat moss-based oil absorbents; and
- software that simulates environmental management scenarios.

Atlantic Canada's environmental industry specializes in environmental products such as site remediation systems; air/soil/water quality testing units; solid waste management programs; and hazardous waste management facilities.

The region boasts environmental services as well, including environmental audits; laboratory services; and environmental health and safety education and training.

Province by province, the environmental industry capabilities are outstanding.

- New Brunswick is recognized for its expertise with wastewater – organic waste from pulp and paper; pharmaceuticals; food processing; and potable water.

- Nova Scotia has achieved some of the highest diversion rates in solid waste management (50%) in the world.

- Prince Edward Island is recognized for its expertise in wind energy, as well as for its solid waste management planning and systems development.

- Newfoundland and Labrador is recognized for its expertise in oil spill contingency planning; oil spill response; and remediation.

Renewable Energy Opportunities

The renewable energy sector is teeming with opportunities. A number of technologies – including gas cogeneration, biomass, peat, tidal, wind, solar power and targeted hydro – are being developed to green and diversify the energy supply within Atlantic Canada.

This sector holds potential for Atlantic Canada to develop a North American expertise in manufacturing; research and development; and service development and delivery.

Atlantic Canada is already a major player in the North American energy industry – offshore oil and gas is a significant contributor to the local economy and the region's electricity, oil and gas are already exported to the energy-hungry northeastern United States market.

Atlantic Canada is looking to attract research and development, manufacturing and other industry services and the region's governments are taking a leadership position.

- **Prince Edward Island** expects to generate 30% of its total energy needs from its own renewable resources by 2016.

- **Nova Scotia**'s goal is to have at least 20% of the province's electrical needs from renewable energy sources by 2013.

- **New Brunswick**'s renewable energy strategy calls for the purchase of up to 300 MW of wind-powered generation by November 2010.

- **Newfoundland and Labrador**'s Energy Plan is evaluating the feasibility of a large-scale wind development project in Labrador in conjunction with the proposed hydroelectric Lower Churchill Project.

Opportunities exist to export wind and other green electricity for consumption in what is described as a "lucrative" New England market that is increasingly sensitive to global environmental challenges. Atlantic Canada is connected to the New England electricity grid through a high capacity power transmission line through New Brunswick into the State of Maine. Renewable energy opportunities in Atlantic Canada are abundant.

Tidal Energy

Atlantic Canada has a distinct competitive advantage in the area of tidal energy. The Bay of Fundy has tides that are among the highest and most powerful in the world. The California-based Electric Power Research Institute has identified 16 different sites in New Brunswick and Nova Scotia where generators could tap into the powerful rise and fall of Bay of Fundy tides. There is already tidal electricity generation in the bay and several firms have announced plans to develop more. In addition, the Nova Scotia government has set up a tidal research facility to support commercial development.

Wind Energy

Wind is an excellent source of clean, renewable electric energy and Atlantic Canada is a potential wind energy powerhouse. The Canadian Wind Energy Atlas indicates our wind resources are among the best in North America, with numerous coastal communities providing significant opportunity. There is also a potential for offshore wind energy.

Solar Energy

Solar energy also holds important potential for the energy sector in Atlantic Canada. Solar energy is one of the fastest growing sources of power in the world and Canada is beginning to adopt this form of renewable energy. While most of the use of solar energy thus far in the region has been limited to small scale projects, large solar farms are emerging across Canada contributing significant electricity to the grid with similar opportunity in this region.

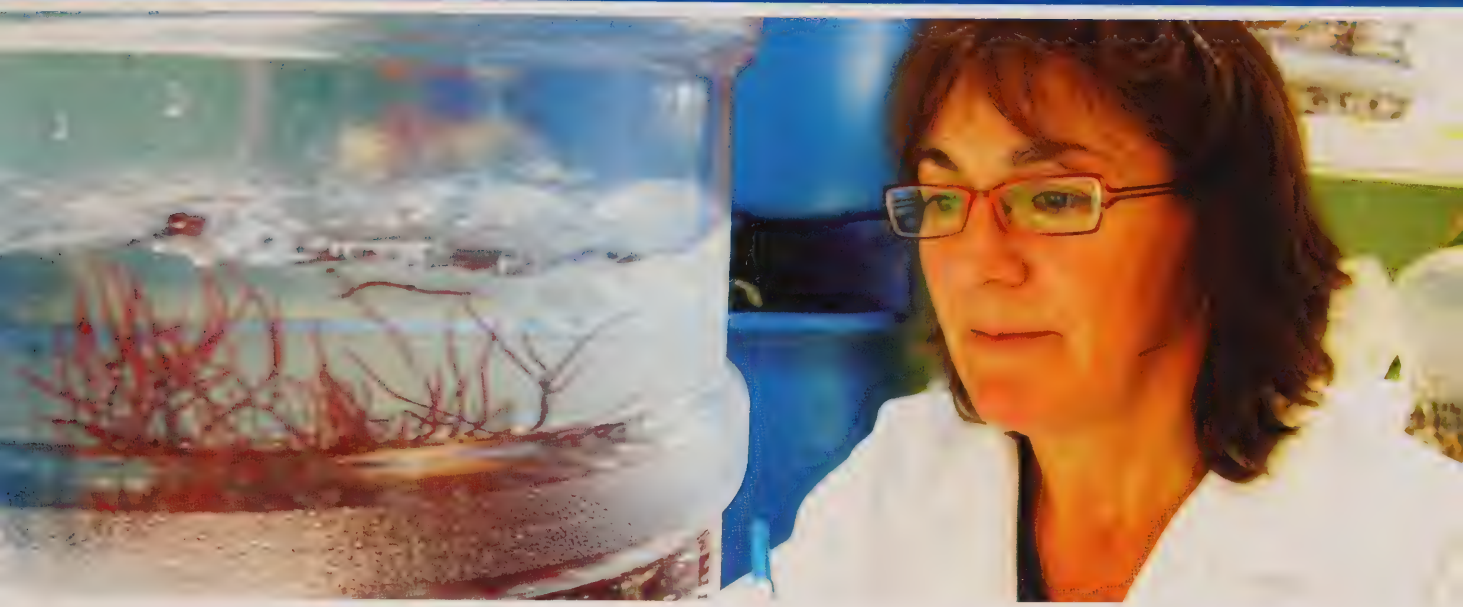
Biomass

Energy from biomass is a key priority of both the federal and provincial governments in Canada. There are targeted incentive programs designed to stimulate this important renewable energy sector. In Atlantic Canada, there are opportunities for biofuels from both agriculture and forest sources. Wood pellet production as a viable source of renewable energy is a growing trend in Atlantic Canada. There are several wood pellet projects being developed in the region, in addition to new biofuels plants.

Geothermal

Geothermal technology harnesses the energy created by the massive amount of heat at the earth's core as well as the cold water in its oceans and lakes. There is some opportunity to harness geothermal for industrial use in the Atlantic provinces. For example, a low-temperature geothermal resource associated with abandoned coal mines at Springhill, Nova Scotia provides direct-use geothermal energy for space heating in an industrial development in that community.

The Atlantic provinces are also starting to see the cold water off its coastline as an important renewable energy source. For example, the Alderney 5 Advanced Geothermal Energy Project in Halifax is the first large-scale application of geothermal cold energy storage in the region. Cold energy harvested from the Atlantic Ocean during winter months will be used to meet peak air conditioning needs in several government buildings. Saint John, New Brunswick is looking at a similar system.



Acadian Seaplants in Dartmouth Nova Scotia

Industry Leaders

Atlantic Canada is home to a number of firms that specialize in environmental and renewable energy products and services. A number of global players have invested in Atlantic Canada as well, and are benefiting from Canada's Atlantic Advantage.

Environmental Products and Services

AMEC – Earth & Environmental (multiple Atlantic Canadian offices), a division of AMEC Americas Limited, offers full-service solutions which include: feasibility studies; site selection; environmental impact assessments; weather forecasting and oceanography; fish habitat compensation planning; biophysical studies; contaminated site and risk assessments; geotechnical engineering design; construction management and materials quality control; environmental effects monitoring and audits; site decommissions; and reclamations.

Envirem Technologies Inc., (Fredericton, NB) is a diversified environmental company specializing in industrial and organic waste recycling and environmental sustainable waste diversion processes. Envirem manufactures, markets and exports various horticultural products including: composts, organic soils, bark mulches, growing media, potting mixes and organic fertilizers (Greenhouse Gold™ and Nutri-Wave™). Envirem currently manages and processes over 500,000 tonnes of forestry and industrial residuals annually through production facilities which include three remediation operations, six composting operations, a bagging plant, an anaerobic digester and a granular organic fertilizer pelletizing plant.

Jacques Whitford Environment Limited, (multiple North American offices) is involved in the design and construction of engineered wetlands; environmental permitting for wind and tidal power installations; Leadership in Energy and Environmental Design (LEED) certification of buildings; Green House Gas (GHG) baseline studies (total carbon footprint determination); GHG management and reduction plans; development of municipal and industrial sustainability plans; watershed and hydro-geological studies; remediation of environmentally impacted sites; environmental spill emergency response; and geotechnical studies in support of all environmental and energy installations.

ADI Group Ltd., (Fredericton, NB) provides consulting; design; project and construction management; environmental management; design-build services; and water and wastewater treatment solutions, worldwide.

Newalta (multiple Atlantic Canadian offices) is the largest Canadian industrial waste management and environmental services provider and focuses on maximizing the value inherent in industrial waste through the recovery of saleable products and recycling. Newalta also provides environmentally sound disposal of solid, non-hazardous industrial waste.

Pol-E-Mar Inc. (St. John's, NL) manufactures PVC solid flotation oil containment booms; oil storage tanks; berms; silt barriers and silt curtains; and permanent rubber booms. The company also supplies reels; power packs; and on-shore, in-shore and off-shore, oil recovery systems. Pol-E-Mar is one of the largest suppliers of oil spill response equipment in Canada.

Blue Line Innovations Inc., (St. John's, NL) has developed an energy conservation device for real-time monitoring of residential consumption of electricity. Domestic energy use studies have demonstrated that real-time feedback yields energy savings anywhere between 10 and 20 percent.

Renewable Energy

Vestas is the world's leading supplier of high-technology wind power solutions, and specializes in the manufacture, sale and service of wind turbines. The company is supplying the turbines for a number of wind energy projects in Atlantic Canada.

Based in Houston and Toronto, **SUEZ Renewable Energy NA** has significant wind energy development projects in Atlantic Canada.

Spain-based wind energy company **Preneal International** (Moncton, NB), is looking at close to $2 billion in wind energy investments in Canada in the coming years.

Enel SpA, Italy's largest electricity utility, is building Newfoundland and Labrador's first wind energy project through its Canadian subsidiary, **NeWind Group Inc**. The St. Lawrence project is to go on line by the end of 2008 and will produce approximately 100,000 megawatt-hours of energy per year.

Ireland-based **OpenHydro** is partnering with **Nova Scotia Power** on the development of tidal energy in the Bay of Fundy.

British Columbia-based **Clean Current Power Systems Incorporated** and Nova Scotia-based **UEK Hydrokinetic** also have tidal energy projects in the Bay of Fundy.

Iceland-based **Maroka ehf** is collaborating with **Fleetway** (Halifax, NS) and is presently supplying Marine Atlantic with an energy management system to improve their energy management on board ocean vessels.

Spanish energy conglomerate **Acciona Energy** is constructing a 49.5 MW wind farm in Lamèque, New Brunswick that will be in service by November 2009. The facility will have 33 Acciona Windpower wind turbines, which will provide 154 gigawatt hours of power per year. Amherst, Nova Scotia will also be the recipient of an Acciona-built wind farm. The Amherst Wind Energy Project will be in place by the end of 2009 and feature 20, 1.5-MW wind turbines – enough energy to power approximately 10,000 homes.

Acciona Energy has also been selected to construct a 64.5 MW wind farm in Aulac, New Brunswick that will be in service by November 2009. This facility will have 43 Acciona Windpower wind turbines, which will provide 177,870 MW hours of power per day – roughly enough power to meet the electricity needs of approximately 10,300 homes.

Alberta-based **TransAlta Corp.** developed a major wind farm project near Moncton, New Brunswick. The 96-megawatt project came on line in December 2008.

Acadian Seaplants in Dartmouth Nova Scotia

Proven Cost Advantages

Atlantic Canada's cost advantages will drive your business growth

Atlantic Canada offers the environmental and renewable energy industries one of the most competitive business cost environments among the G8 countries. In the 2008 edition of *Competitive Alternatives: KPMG's Guide to International Business Location*, Atlantic Canada's cities ranked among the lowest cost locations for all of the industries reviewed.

On average, location-sensitive costs (i.e. costs that vary based on where a facility is located) were up to 20% lower in Atlantic Canada than other locations for manufacturing operations, and up to 36% lower for research and development operations.

Why are our costs lower? Add it up...

- A lower cost of living means a dollar goes further in Atlantic Canada;
- 15%-30% lower employer benefit costs compared to U.S. and European locations;
- Lower construction and facilities costs;
- Lower utility costs;
- Lower employer-paid health care costs; and
- Lower corporate tax rates than many U.S. and European locations.

If this doesn't convince you that Atlantic Canada is an ideal investment opportunity, consider this – Atlantic Canada offers one of the most generous research and development incentive programs in any G8 country. Plus there are very few restrictions on foreign investment in the environmental and renewable energy industries.

And what do your counterparts around the world think of Canada's Atlantic Advantage? Ninety-eight percent of foreign companies who operate here say that Atlantic Canada meets or exceeds their expectations[4].

TOTAL LOCATION SENSITIVE COSTS (US$ 000s)*

	MANUFACTURING Total Location - Sensitive Costs* Average of 11 Operations ($000s)	RESEARCH AND DEVELOPMENT Total Location - Sensitive Costs* Average of 3 Operations ($000s)
Germany	$12,746	$10,314
Japan	$12,598	$9,913
Netherlands	$11,490	$9,077
United Kingdom	$11,383	$8,923
Italy	$11,350	$8,396
France	$10,877	$8,242
United States	$10,420	$8,227
Australia	$10,327	$8,192
Atlantic Canada	$10,198	$6,574

SOURCE: *Competitive Alternatives: KPMG's Guide to International Business Location, 2008 Edition.*
** Business costs in U.S. funds. The Atlantic Canada figure is an average of seven cities in the four provinces.*

4 **SOURCE:** *Report on Foreign Direct Investment Operations in Atlantic Canada, June 2005*

Excellent Workforce

Atlantic Canada has the type of employees you want – well-educated, hard-working and reliable

Known for its dedication and commitment – as well as low employee turnover and absenteeism – Atlantic Canada's workforce is second to none and offers many advantages, making the region one of the most economical places in the world to do business.

Atlantic Canadian companies have access to a labour force that is bilingual, highly skilled and highly educated. Atlantic Canada is home to 17 universities and numerous colleges and post-secondary training centres.

The region boasts one of the highest rates of annual post-secondary graduates per capita in North America and in 2007, there were over 88,000 undergraduate and graduate students attending university. Atlantic Canada's universities have a solid track record in the area of environmental sciences as well.

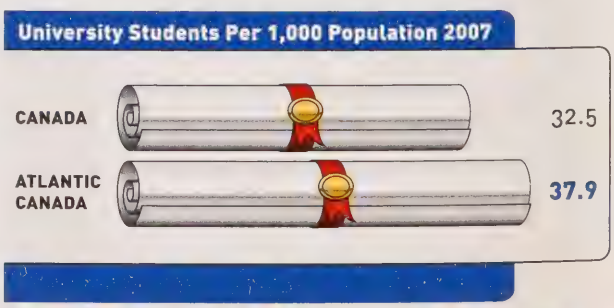
- **Memorial University of Newfoundland** (St. John's, NL) Bachelor and masters degree programs in environmental science, physics, engineering and applied science
- **Université de Moncton** in (Moncton, NB) Interdisciplinary masters degree program in environmental studies
- **Dalhousie University** (Halifax, NS) Bachelor and masters degree programs in environmental design, science, engineering and environmental management
- **Mount Allison University** (Sackville, NB); **University of New Brunswick** (Fredericton, NB); **St. Thomas University** (Fredericton, NB); **Acadia University** (Wolfville, NS); **Cape Breton University** (Sydney, NS); **Nova Scotia Agricultural College** (Truro, NS) and **Saint Mary's University** (Halifax, NS) Degree programs in environment-related training

Many of the region's post-secondary institutions offer students research opportunities in renewable energy.

- **Dalhousie University's** Renewable Energy Research Network (Halifax, NS) has research strengths in wind energy, biomass and hydrogen-based energy.
- The **University of New Brunswick** (Fredericton, NB) is conducting extensive research into wood energy and cellulosic bio-fuels.
- **Université de Moncton's** K.C. Irving Chair on Sustainable Development (Moncton, NB), plays a lead role in research and development of wind energy in Atlantic Canada. Researchers have created wind atlases for the Atlantic Canadian region that illustrate how much wind is available, and where.
- **Memorial University of Newfoundland** (St. John's, NL) offers its researchers an advanced wind energy research lab.

Several of the region's universities and colleges offer post-secondary education in geomatics as well. The **Nova Scotia Community College**'s Applied Geomatics Research program is a valuable resource for both the environmental and renewable energy sectors.

Progressive programs like these will ensure a continued source of capable, innovative workers – an invaluable resource in Atlantic Canada's environmental and renewable energy industries – for years to come.



The Annapolis Tidal Power Plan in Annapolis Royal, Nova Scotia

Strategic Location

Atlantic Canada is the gateway to the North American and European Markets

Atlantic Canada is uniquely positioned as the gateway between Europe and North America. The North American Free Trade Agreement (NAFTA) provides a significant advantage for investors – unfettered access to the largest economic market in the world, with a consumer-base of 425 million people.

Atlantic Canadian ports are two days closer to Europe than any other port on the eastern seaboard, and within one day's drive of half of the North American population. With the growth of the Indian sub-continent and the Arabian Peninsula, Atlantic Canada is quickly becoming the gateway between the Suez Canal and the North American market.

Atlantic Canadian companies export over C$125 million worth of trade to 160 countries, every day. Three of the four Atlantic Provinces (New Brunswick, Nova Scotia, Newfoundland and Labrador) hold the distinction of being rated among the top 10 U.S. states and Canadian provinces for exports per capita.

Canada's *Atlantic Advantage* is further evidenced by our infrastructure, which brings the world to our door:

- world-class, high-speed telecommunications;
- year-round deepwater ports;
- international airports;
- rail service; and
- specialized trucking.

Atlantic Canada's four provincial governments are partnering with the federal government to develop the Atlantic Gateway, a project which will inject hundreds of millions of dollars in the region's transportation infrastructure over the next few years.

Wind Energy Projects

Atlantic Canada is already home to 26 active wind energy projects with eight more projects across the region currently in the works.

Active Wind Energy Projects in Atlantic Canada

WIND PROJECTS	INSTALLED YR/MONTH	TURBINES	CAPACITY (MW)	COMPANY
Newfoundland and Labrador				
Ramea	2004/10	6 x 65 kW Windmatic WM15S	0.390	Frontier Power Systems Inc.
Nova Scotia				
Amherst Wind Energy Project	2009/12	20 x 1.5 MW Acciona turbines	30.00	Acciona Energy
Brookfield	2005/11	1x Turbowinds T-600	0.60	Renewable Energy Services Limited
Digby Limited	2006/12	1x Enercon E48 (800 kW)	0.80	Renewable Energy Services Limited
Fitzpatrick 2 Limited	2006/12	1x Enercon E48 (800 kW)	0.80	Renewable Energy Services Limited
Fitzpatrick Mtn.	2006/04	1x Enercon E48 (800 kW)	0.80	Renewable Energy Services Limited
Glace Bay & Donkin	2005/11	2x Enercon (800 kW)	1.60	Cape Breton Power
Grand Etang, Inverness County	2002/10	1x Vestas V47-660 (660 kW)	0.66	Nova Scotia Power
Halifax	2005/11	1x Turbowinds (600 kW)	0.60	Renewable Energy Services Limited
Higgins Mountain Riverhurst	2006/12	3x Vensys 1.2 MW turbine	3.60	Vector Wind Energy/Springhill
Lingan	2007/01	5x Enercon 2 MW	10.00	Cape Breton Power
Lingan	2006/06	2x Enercon 2 MW	4.00	Cape Breton Power
Little Brook	2002/10	1x Turbowinds T600	0.60	Nova Scotia Power
Marshville Limited	2006/12	1x Enercon E49 (800 kW)	0.80	Renewable Energy Services Limited
Point Tupper	2006/04	1x Enercon E48 (800 kW)	0.80	Renewable Energy Services Limited
Pubnico Point – Phase 1	2004/01	2x 1.8 MW Vestas	3.60	Atlantic Wind Power Corp.
Pubnico Point – Phase 2	2005/01	15x Vestas 1.8 MW	27.00	Atlantic Wind Power Corp.
Springhill Project	2005/12	1x 1.2 MW Vensys	1.20	Vector Wind Energy
Springhill Riverhurst	2006/12	1x Americas Wind Energy	0.90	Vector Wind Energy/Springhill
Tiverton Riverhurst	2006/12	1x Americas Wind Energy	0.90	Vector Wind Energy/Springhill
Prince Edward Island				
Aeolous	2003/08	1x Vestas V90	3.00	Aeolous PEI Wind
Eastern Kings Wind Farm	2007/01	10x Vestas V90 3 MW turbines	30.00	PEI Energy Corporation
North Cape	2004/01	8x Vestas V47-660 (660 kW)	5.28	Prince Edward Island Energy Corporation
North Cape	2001/11	8x Vestas V47-660 (660 kW)	5.28	Prince Edward Island Energy Corporation
Norway Wind Park	2007/06	3x Vestas V90 3 MW	9.00	Ventus Energy
West Cape Wind Farm Phase 1	2007/05	11x Vestas V80 1.8 MW	19.80	West Cape Wind Energy Inc.

SOURCE: *CanWEA December 2007*

Upcoming Wind Energy Projects in Atlantic Canada

PROJECT NAME	PROJECTED COMPLETION	SIZE	DEVELOPER
New Brunswick			
Lamèque Island	2009	49.5 MW	Acciona Energy
Caribou Mountain	2009	99.0 MW	SUEZ Renewable Energy NA
Aulac Project	2009	64.5 MW	Acciona Energy
Kent Hills	2008	96.0 MW	TransAlta Corp.
Newfoundland and Labrador			
Fermeuse	2008 Labrador	24.0 MW	SkyPower
St. Lawrence	2008 Labrador	27.0 MW	NeWind Group Inc.
Nova Scotia			
Statia Terminals	2009	22.0 MW	RESL
Dalhousie Mountain	2009	51 MW	RMSenergy
Maryvale	2009	6 MW	RMSenergy
Nuttby Mountain	2009	45 MW	Earthfirst Canada
Digby Wind Park	2009	30 MW	SkyPower/Scotia Windfields
Glen Dhu Wind Park	2009	60 MW	Shear Wind
Prince Edward Island			
West Cape Phase 2	2008	79.2 MW	Ventus Energy

Signed Power Purchase Agreement and/or already under construction. **SOURCE:** *CanWEA as of June 2008.*

Windmills in North Cape, Prince Edward Island

Nothing But Blue Sky

Be part of the vibrant, growing Atlantic Canadian environmental and renewable energy industries

There you have it. Atlantic Canada's strategic location, low business costs, skilled and dedicated employees, robust infrastructure and supportive partners combine to ensure the region's continued growth and innovation in the environmental and renewable energy industries. International firms wanting to enter, or expand within, the North American market, need look no further than Atlantic Canada.

The opportunities are vast. The potential is great. Find out how you could benefit from Canada's *Atlantic Advantage*.

We Can Help Your Company Succeed In Atlantic Canada
The Atlantic Canada Opportunities Agency (ACOA) is the federal government agency responsible for helping to build economic development in the Atlantic provinces. Tapping into a variety of programs and services, ACOA ensures that companies looking to locate in Atlantic Canada have access to a range of practical support to help them successfully develop their businesses.

www.acoa-apeca.gc.ca/invest

The Atlantic Canada Opportunities Agency works with business and communities to make Atlantic Canada more innovative, productive and competitive. Together, with Atlantic Canadians, we are building a stronger economy.

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Commitment to Sustainable Development
The Atlantic Canada Opportunities Agency is committed to protecting the environment by promoting sustainable businesses and communities in Atlantic Canada.

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